*****Suspended*****

Trend Study 3-10-96

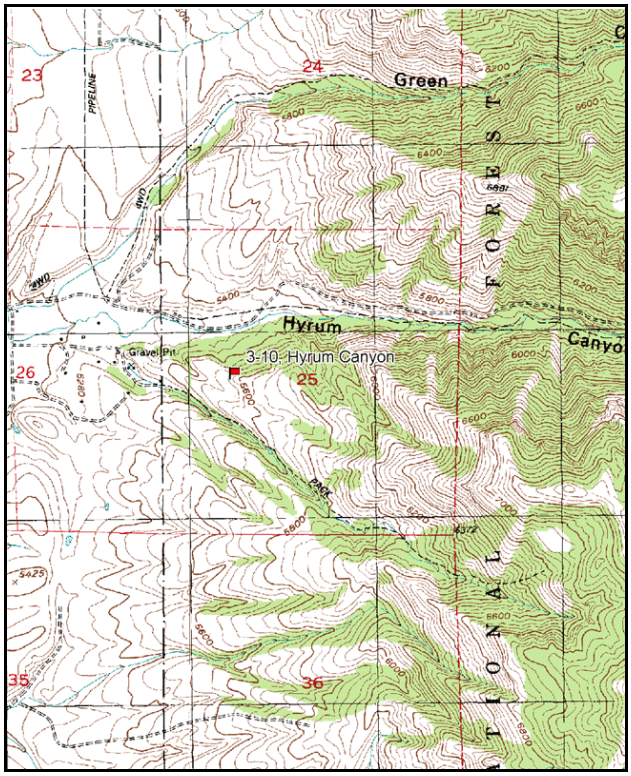
Study site name: Hyrum Canyon . Vegetation type: Big Sagebrush-Grass .

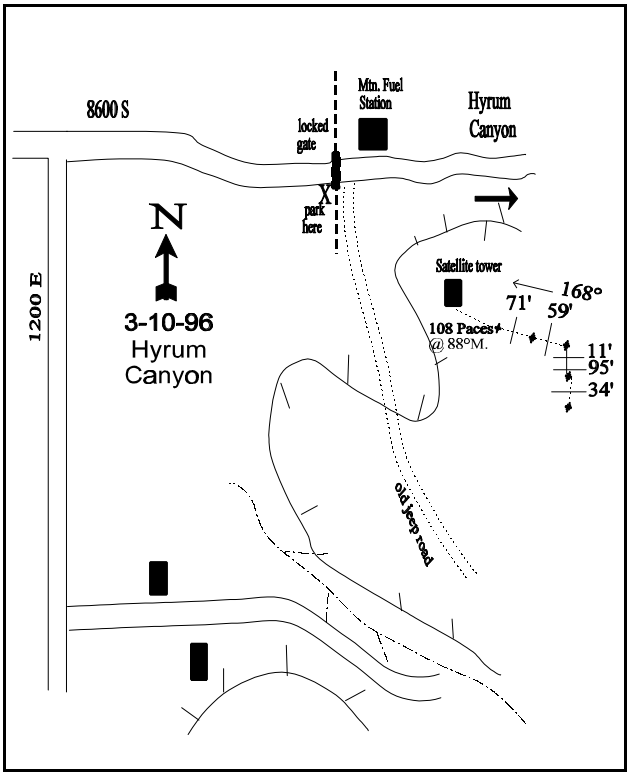
Compass bearing: frequency baseline 146 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Drive east from the town of Paradise to the intersection of 1200 East and 8600 South. Continue east towards Hyrum Canyon for 0.5 miles to a Mountain Fuel station and a locked gate. Park here and walk approximately ½ mile southeast up on the sagebrush bench to a satellite receiving tower. From this reflector walk 155 paces at a bearing of 90 degrees magnetic to the 0-foot baseline stake, located by a small maple. This stake is marked by browse tag #7981. Lines three and four are run off the 0-foot stake at a bearing of 348 degrees magnetic.





Map Name: Paradise

Diagrammatic Sketch

Township 10N , Range 1E , Section 25

UTM 4602730 N 434220 E

DISCUSSION

Trend Study No. 3-10

*****SUSPENDED** - This site was suspended in 2001 and will be reevaluated in 2006. This study was not read in 2001 due to access problems. Text and data tables are included from the 1996 report.

The Hyrum Canyon study samples a mountain big sagebrush-grass community located east of Paradise at an elevation of 5,560 feet. The area is considered critical deer winter range. It has a moderate slope (15%) and a southwest aspect. This area supports a dense and vigorous stand of mountain big sagebrush that has sustained moderate to heavy use from deer, domestic sheep, horses and cattle in the past. Currently ('96), there were no signs of domestic grazing or any wildlife pellet groups. Understory composition has been unfavorably influenced by past heavy grazing practices.

Soil is "Nebeker Silt Loam," an alluvially deposited, well-drained soil derived from sandstone, quartzite and shale. This soil is moderately deep and slightly acidic but becomes increasingly clayey and calcareous at depths greater than four feet. Water holding capability, permeability and erosion hazard are all moderate. Dry farmed cropland is a principal use of Nebeker soil (Erickson and Mortensen 1974). Sampled soils at the site have a clay loam texture with a slightly acid soil reaction (6.4 pH). Effective rooting depth (see methods) is estimated at nearly 16 inches. Due to the gentle slope and good plant cover, the site shows few signs of erosion. Organic matter is moderately high at over 4%.

Browse composition consists almost exclusively of mountain big sagebrush. Vigor, even of decadent plants, is good. Population density has remained fairly stable at around 3,000 plants/acre since 1984. Utilization was heavy in 1984, but mostly light in 1990 and 1996. Percent decadence was moderately low in 1996 at 15%. Seedlings were extremely abundant in 1990 (14,466 per acre) but none were encountered in 1996. Some of the difference in the number of seedlings is likely due to the greatly increased sample used in 1996 which better estimates shrub populations with clumped and/or discontinuous distributions. Also, the abundant herbaceous understory and prolonged drought have likely combined to reduce seedling establishment and survival.

The understory has been depleted as a result of past sheep, cattle and horse use. Although perennial grasses are present, they are inferior in both numbers and production to invader and increaser forbs and annual grasses. Annual grasses consisting of Japanese brome and cheatgrass provide 91% of the grass cover in 1996. Perennial grasses include Kentucky bluegrass, Sandberg bluegrass, bluebunch wheatgrass, slender wheatgrass and bulbous bluegrass. Forbs are diverse and abundant, producing nearly as much cover as the grasses. Desirable perennial and biennial forbs are rare however. Among the less desirable forbs are curlycup gumweed, autumn willowweed, ragweed, annual sunflower, dyers woad, tarweed and spreading fleabane daisy.

1984 APPARENT TREND ASSESSMENT

Soil is deep and fertile and shows few signs of serious erosion in spite of some trampling and compaction by livestock. Trend appears stable. Vegetative trend also appears stable with respect to the key browse species but slightly down for understory composition.

1990 TREND ASSESSMENT

Mountain big sagebrush has excellent vigor, good reproduction and light hedging. From a population that was classified as 44% decadent yet stable in 1984, sagebrush values for density have increased slightly. The dense and healthy understory of Kentucky bluegrass increased in frequency. However, annual and weedy increaser species are abundant. Vegetative cover increased and the percentage of bare soil decreased to 9%.

TREND ASSESSMENT
soil - slightly up (4)
browse - up for the key species, mountain big sagebrush (5)
herbaceous understory - slightly downward because of the large quantities of weedy increaser species and annuals (2)

1996 TREND ASSESSMENT

The soil trend is up due to a notable decline in bare ground (8% to 1%) and a large increase in litter cover (55% to 80%). Vegetation and litter cover are very abundant and almost completely cover the ground surface. No erosion is evident. Trend for sagebrush is stable. It appears that the sagebrush population has reached its density limit. Most plants appear unutilized and vigorous with abundant seed production. Percent decadence is moderately low at 15%. The herbaceous understory is very abundant producing nearly 50% average cover. The herbaceous cover is split nearly equal between grasses and forbs. Unfortunately, 91% of the grass cover comes from annual brome grasses (Japanese brome and cheatgrass). Sum of nested frequency for the most common perennial grass in 1990, Kentucky bluegrass, has declined by 72%. It currently has a quadrat frequency of only 15%. Forbs are diverse and productive, yet the composition is extremely poor. The most common perennial species would include willowweed, curlycup gumweed, tarweed, Louisiana sage, western yarrow, dyers woad, prickly lettuce and yellow salsify. Sum of nested frequency for perennial grasses has declined, while sum of nested frequency for perennial forbs has remained similar. Trend is considered down.

TREND ASSESSMENT
soil - up (5)
browse - stable (3)
herbaceous understory - down with an extremely poor composition (1)

HERBACEOUS TRENDS --
Herd unit 03 , Study no: 10

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	'96
G	Agropyron intermedium	-	12	-	-	4	-	-
G	Agropyron spicatum	11	7	9	4	3	4	.19
G	Agropyron trachycaulum	a-	a2	b15	-	2	7	.80
G	Bromus japonicus (a)	-	-	359	-	-	99	22.79
G	Bromus tectorum (a)	-	-	55	-	-	19	2.61
G	Poa bulbosa	a-	b24	a5	-	9	3	.04
G	Poa pratensis	b104	b130	a37	45	53	15	1.18
G	Poa secunda	a-	b10	b17	-	5	10	.27
Total for Annual Grasses		0	0	414	0	0	118	25.40
Total for Perennial Grasses		115	185	83	49	76	39	2.50
Total for Grasses		115	185	497	49	76	157	27.90
F	Achillea millefolium	60	71	76	21	27	30	2.12
F	Agoseris glauca	ab6	b13	a-	3	5	-	-
F	Alyssum alyssoides (a)	-	-	10	-	-	4	.02
F	Artemisia ludoviciana	17	17	11	5	5	4	1.31
F	Cirsium spp.	-	3	-	-	2	-	-
F	Collomia linearis (a)	-	-	1	-	-	1	.00
F	Collinsia parviflora (a)	-	-	8	-	-	3	.04
F	Cryptantha spp.	a-	a-	b42	-	-	17	.50
F	Descurainia pinnata (a)	-	-	5	-	-	2	.01
F	Epilobium brachycarpum (a)	-	-	225	-	-	79	8.24
F	Erigeron spp.	-	-	2	-	-	2	.33
F	Galium aparine (a)	-	-	72	-	-	30	.93
F	Gilia aggregata	-	6	-	-	4	-	-
F	Grindelia squarrosa	ab98	b125	a72	37	53	28	4.13
F	Hackelia patens	a20	b39	ab34	10	21	18	.54
F	Holosteum umbellatum (a)	-	-	3	-	-	1	.00
F	Isatis tinctoria	a-	a-	b34	-	-	17	.89
F	Lappula occidentalis (a)	-	-	14	-	-	6	.05
F	Lactuca serriola	a-	a-	b50	-	-	22	.71
F	Lupinus caudatus	-	1	-	-	1	-	-
F	Madia glomerata (a)	-	-	15	-	-	8	.09
F	Microsteris gracilis (a)	-	-	4	-	-	2	.01
F	Penstemon spp.	-	-	2	-	-	1	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	'96
F	Phlox longifolia	-	-	3	-	-	1	.00
F	Polygonum douglasii (a)	-	-	45	-	-	18	.21
F	Taraxacum officinale	-	4	-	-	2	-	-
F	Tragopogon dubius	40	42	37	24	23	17	.55
F	Unknown forb-perennial	-	8	-	-	6	-	-
F	Veronica biloba (a)	-	-	7	-	-	2	.03
F	Viola spp.	-	11	-	-	4	-	-
F	Zigadenus paniculatus	-	-	5	-	-	3	.01
Total for Annual Forbs		0	0	409	0	0	156	9.66
Total for Perennial Forbs		241	340	368	100	153	160	11.12
Total for Forbs		241	340	777	100	153	316	20.79

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 03 , Study no: 10

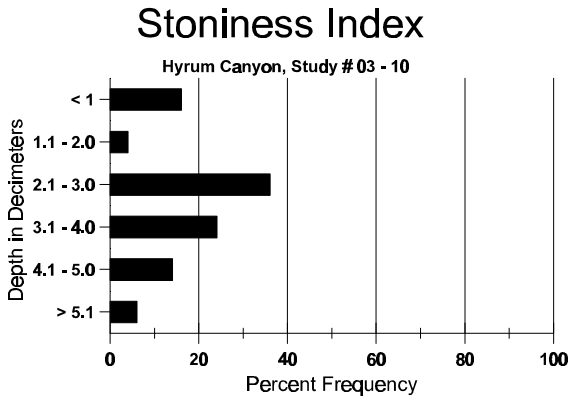
Type	Species	Strip Frequency	Average Cover %
		'96	'96
B	Acer grandidentatum	1	.03
B	Artemisia tridentata vaseyana	91	24.34
B	Gutierrezia sarothrae	1	.15
B	Juniperus scopulorum	1	.85
Total for Browse		94	25.37

BASIC COVER --
Herd unit 03 , Study no: 10

Cover Type	Nested Frequency	Average Cover %		
	'96	'84	'90	'96
Vegetation	383	2.25	35.50	62.45
Rock	41	0	0	.20
Pavement	44	1.00	.75	.18
Litter	399	82.50	55.25	79.99
Cryptogams	3	.25	0	.00
Bare Ground	60	14.00	8.50	1.22

SOIL ANALYSIS DATA --
Herd Unit 03, Study no: 10, Hyrum Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.5	58.6 (17.4)	6.4	27.9	36.1	36.0	4.5	23.6	262.4	.6



BROWSE CHARACTERISTICS --
Herd unit 03 , Study no: 10

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Acer grandidentatum																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	1	-	-	-	-	-	-	1	-	-	-	66	34	26	1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	100%	00%	+ 0%
'90	00%	100%	00%	-70%
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	66	Dec:	-
	'90	66		-
	'96	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	187	-	-	30	-	-	-	-	-	217	-	-	-	14466			217
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	2	-	-	-	-	-	-	-	2	-	-	-	133			2
	90	11	1	-	1	-	-	-	-	-	13	-	-	-	866			13
	96	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
M	84	4	8	11	-	-	-	-	-	-	23	-	-	-	1533	19	17	23
	90	28	4	2	-	-	-	-	-	-	31	1	2	-	2266	22	24	34
	96	116	-	-	-	-	-	-	-	-	116	-	-	-	2320	28	40	116
D	84	-	7	13	-	-	-	-	-	-	20	-	-	-	1333			20
	90	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	96	21	2	-	-	-	-	-	-	-	23	-	-	-	460			23
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1080			54

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	38%	53%	00%	+10%
'90	12%	04%	04%	- 8%
'96	01%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	2999	Dec:		44%
'90	3332			6%
'96	3060			15%

Chrysothamnus viscidiflorus stenophyllus																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	27	54	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	0			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	12	15	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	20			-

Juniperus scopulorum																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	20			-